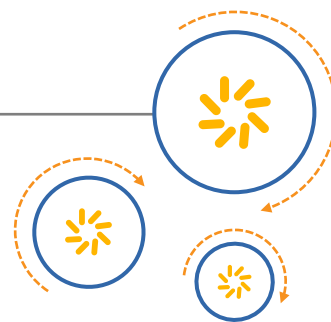


RF360 Europe GmbH

A Qualcomm – TDK Joint Venture



SAW Components

SAW RF filter for base station

LTE

Series/type:	B5159
Ordering code:	B39172B5159U410
Date:	February 15, 2012
Version:	2.0

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SAW Components

B5159

SAW RF filter

1747.5 MHz

Data sheet

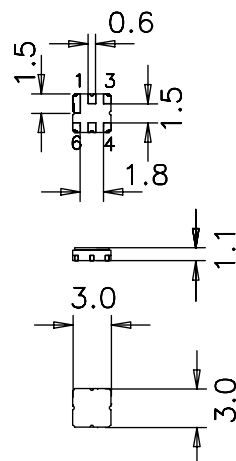


Application

- RF filter for LTE base station
- Usable passband 75 MHz
- High rejection in upper stopband
- Unbalanced operation

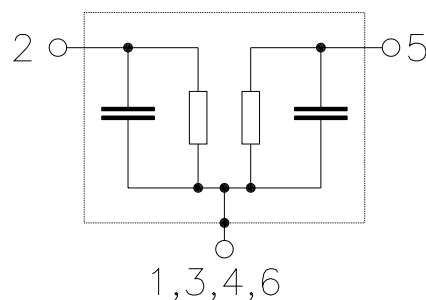
Features

- Package size 3.0 x 3.0 x 1.10 mm³
- Package code DCC6C
- RoHS compatible
- Approximate weight 0.037 g
- Ceramic Package for **Surface Mount Technology (SMT)**
- Ni, gold-plated terminals
- **Electrostatic Sensitive Device (ESD)**
- Filter surface passivated
- Moisture Sensitivity Level 1



Pin configuration

- 2 Input
- 5 Output
- 1, 3, 4, 6 To be grounded



SAW Components
B5159
SAW RF filter
1747.5 MHz
Data sheet

Characteristics

Temperature range for specification:

 $T = -33\text{ }^{\circ}\text{C to }+100\text{ }^{\circ}\text{C}$

Terminating source impedance:

 $Z_S = 50\text{ }\Omega$ unbalanced and matching network

Terminating load impedance:

 $Z_L = 50\text{ }\Omega$ unbalanced and matching network

		min.	typ. @ 25 °C	max.	
Nominal frequency	f_N	—	1747.5	—	MHz
Maximum insertion attenuation (including matching network)	$\alpha_{\max}$	—	2.2	3.3	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
1710 ... 1785 MHz		—	0.3	1.2	dB
1710 ... 1785 MHz (in any contiguous 5MHz band)		—	0.1	0.8	dB
Group delay ripple (p-p)	$\Delta\tau$				
1710 ... 1785 MHz		—	6	20	ns
Phase ripple (p-p)	$\Delta\phi$				
1710 ... 1785 MHz		—	12	—	°
Error vector magnitude¹⁾	EVM				
1710 ... 1785 MHz		—	0.2	1.0 ²⁾	%
Absolute group delay	τ				
1710 ... 1785 MHz		—	13	20	ns
Relative attenuation (relative to $\alpha_{\max}$)	α_{rel}				
70 ... 110 MHz		30	78	—	dB
300 ... 400 MHz		30	61	—	dB
852 ... 1291 MHz		25	44	—	dB
1205 ... 1250 MHz		30	45	—	dB
1372 ... 1603 MHz		25	34	—	dB
1603 ... 1681 MHz		10	17	—	dB
1885 ... 1960 MHz		20	31	—	dB
2110 ... 2170 MHz		25	48	—	dB
2422 ... 2507 MHz		45	52	—	dB
3775 ... 3915 MHz		25	66	—	dB
4295 ... 4942 MHz		15	50	—	dB

SAW Components		B5159
SAW RF filter		1747.5 MHz
Data sheet		

	min.	typ. @ 25 °C	max.	
VSWR				
input 1710 ... 1785 MHz	—	1.6:1	2.2:1	
output 1710 ... 1785 MHz	—	1.5:1	2.2:1	
Temperature Drift				
high temperature ³⁾ 1710 ... 1785 MHz	—	0.2	0.5 ⁴⁾	dB
low temperature ⁵⁾ 1710 ... 1785 MHz	—	0.15	0.4 ⁶⁾	dB

- 1) EVM calculation based on root raised cosine filtered QPSK signal (f_{CRRC} within 1717.5 ... 1782.5 MHz, bw_{RRC} = 3.84 MHz)
2) EVM relaxed to 2.5 % for f_{CRRC} = 1712.5 MHz for temperatures below 0 °C
3) T_{25°C} is transmission at 25 °C in dB, T_{100°C} at 100 °C in dB

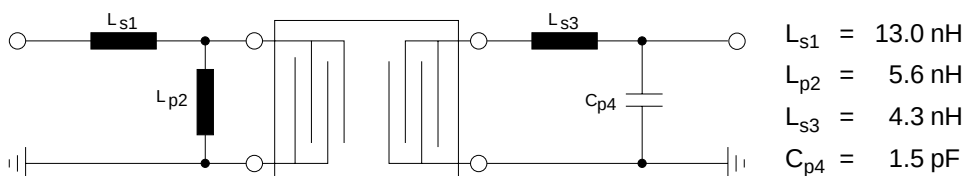
$$\text{tempdrift}_{\text{hightemp}} = \left| \frac{\max(T_{25^\circ\text{C}} - T_{100^\circ\text{C}}) - \min(T_{25^\circ\text{C}} - T_{100^\circ\text{C}})}{2} \right|$$

- 4) 0.35 dB for frequency range 1715 ... 1780 MHz (roll-offs excluded)
5) T_{25°C} is transmission at 25 °C in dB, T_{-33°C} at -33 °C in dB

$$\text{tempdrift}_{\text{lowtemp}} = \left| \frac{\max(T_{25^\circ\text{C}} - T_{-33^\circ\text{C}}) - \min(T_{25^\circ\text{C}} - T_{-33^\circ\text{C}})}{2} \right|$$

- 6) 0.35 dB for frequency range 1715 ... 1780 MHz (roll-offs excluded)

Matching network to 50 Ω unbalanced input and output



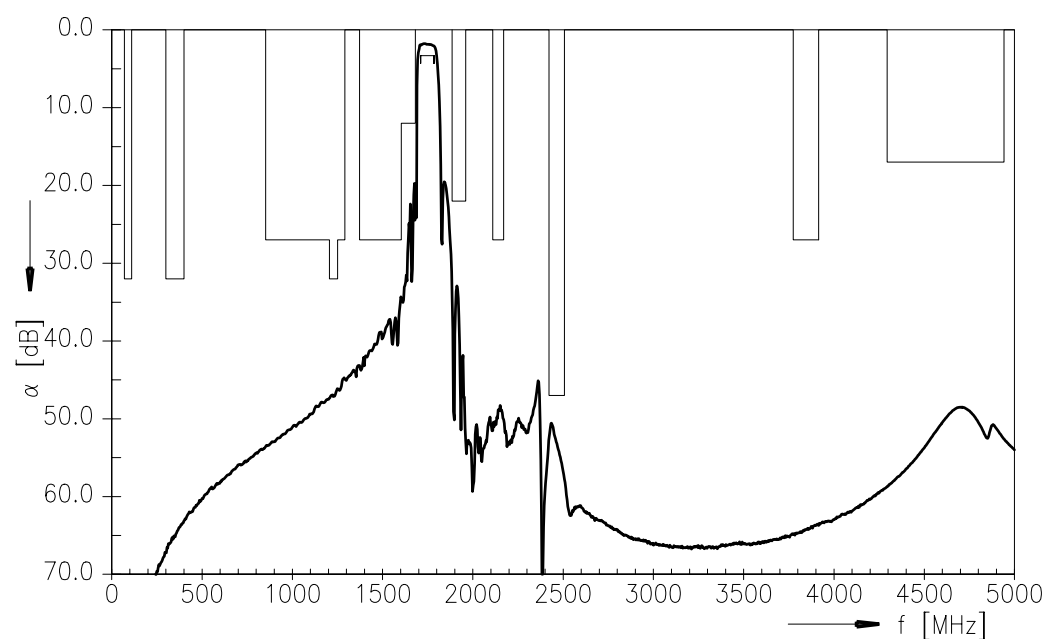
Element values depend upon board layout and properties.

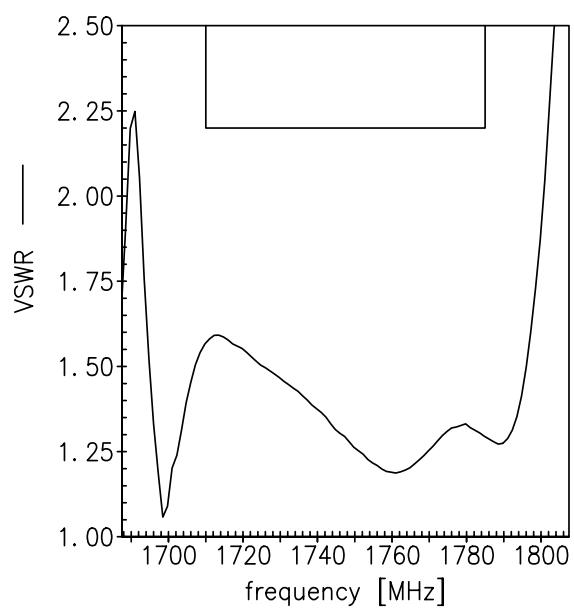
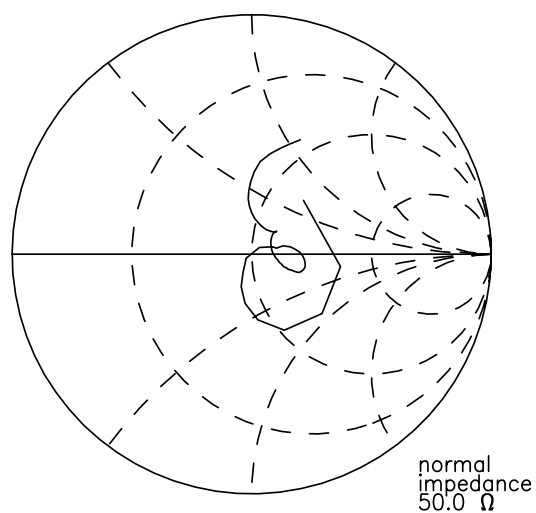
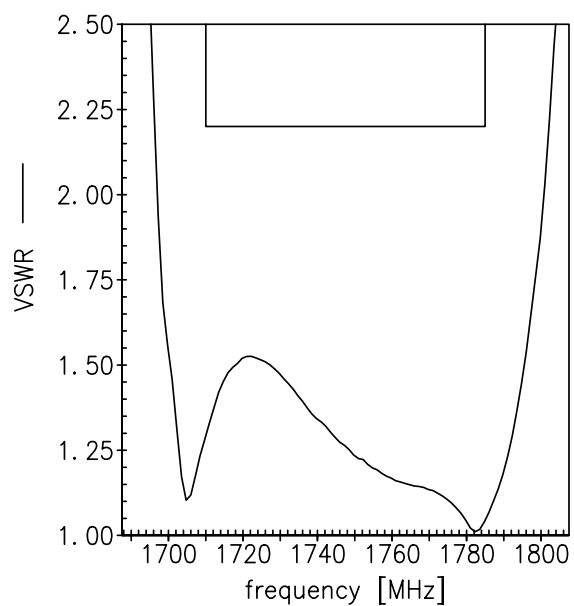
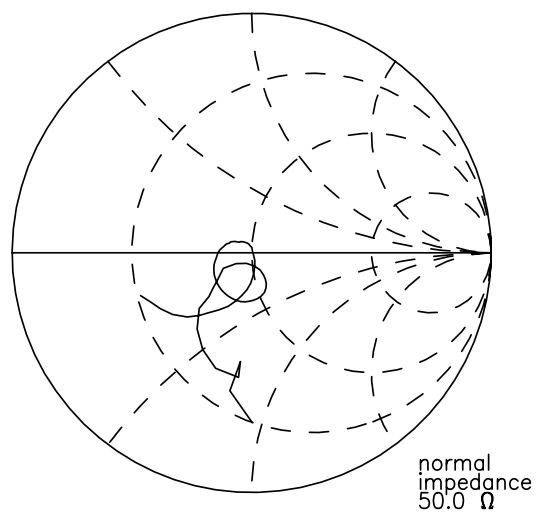
Maximum ratings

Operable temperature range	T	-40/+100	°C	machine model, 1 pulse
Storage temperature range	T _{stg}	-40/+100	°C	
DC voltage	V _{DC}	5	V	
ESD voltage	V _{ESD}	50 ¹⁾	V	
Input power at				
1710...1785MHz	P _{IN}	22	dBm	24 h, 55 °C, CW

- 1) acc. to JESD22-A115A (machine model), 1 negative & 1 positive pulse.

Transfer function (S21, narrowband, normalized)

Transfer function (S21, wideband)


Smith charts
 S_{11} function

 S_{22} function


SAW Components
B5159
SAW RF filter
1747.5 MHz

Data sheet


References

Type	B5159
Ordering code	B39172B5159U410
Marking and package	C61157-A7-A67
Packaging	F61074-V8168-Z000
Date codes	L_1126
S-parameters	B5159_NB.s2p, B5159_WB.s2p see file header for port/pin assignment table
Soldering profile	S_6001
RoHS compatible	defined as compatible with the following documents: "DIRECTIVE 2002/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment. 2005/618/EC from April 18th, 2005, amending Directive 2002/95/EC of the European Parliament and of the Council for the purposes of establishing the maximum concentration values for certain hazardous substances in electrical and electronic equipment."
Matching coils	See Inductor pdf-catalog http://www.tdk.co.jp/tefe02/coil.htm#aname1 and Data Library for circuit simulation http://www.tdk.co.jp/etvcl/index.htm for a large variety of matching coils.

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